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10/649,409	08/27/2003	Karl Schrodinger	16274.164	6421

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WORKMAN NYDEGGER
60 EAST SOUTH TEMPLE
1000 EAGLE GATE TOWER
SALT LAKE CITY, UT 84111

EXAMINER	
BELLO, AGUSTIN	
ART UNIT	PAPER NUMBER
2613	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/649,409	SCHRODINGER, KARL	
	Examiner	Art Unit	
	Agustin Bello	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *17-31,33-35,38,40 and 41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *33* is/are allowed.

6)☒ Claim(s) *17-31,33-35,38,40 and 41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 17-28, 34-35, and 40-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ewen (U.S. Patent No. 6,862,322) in view of Williams (U.S. Patent No. 4,574,249) and Kimura (Patent No. US 7,105,797 B2).

Regarding claim 17, Ewen teaches an optical reception device (reference numeral 101 in Figure 3A); and an amplifier (reference numeral 102' in Figure 3A) connected to said reception device; said amplifier having a gain (inherent); and said amplifier including at least one control terminal that receives a control signal (reference numeral 301 in Figure 3A) for setting said gain of said amplifier between at least two gain values (e.g. by virtue of changing the impedance of the transimpedance amplifier via the control line) in a continuously various manner (i.e. "dynamically adjusting" of (column 6 lines 1-22), and a control circuit external to the amplifier (inherently connected to the control line 301 in Figure 3A) having a first terminal that provides the control signal to the control terminal. Ewen differs from the claimed invention in two manners.

First, Ewen fails to specifically teach that at least one gain value between the at least two gain values is optimized for maximum sensitivity. However, Williams teaches that optimizing at least one gain value between the at least two gain values for maximum sensitivity is well known

in the art (column 20 lines 27-28). One skilled in the art would have been motivated to optimize at least one gain value between the at least two gain values for maximum sensitivity since doing so extends the dynamic range of the receiver without sacrificing sensitivity (column 19 lines 31-37 of Williams). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to optimize at least one gain value between the at least two gain values for maximum sensitivity.

Second, while Ewen inherently teaches the claimed external controller, Ewen fails to specifically teach that the control circuit includes at least a second terminal coupled to an output terminal of the amplifier, and a third terminal via which a user-end control signal can be fed into the control circuit. However, Kimura teaches that external controllers that include at least a second terminal (reference numeral 3 in Figure 3) coupled to an output terminal of the amplifier, and a third terminal (reference numeral 7 in Figure 3) via which a user-end control signal can be fed into the control circuit are well known in the art. One skilled in the art would have been motivated to include a controller of this type as part of Ewen's apparatus in order to eliminate pulse width distortion (column 8 lines 7-12 of Kimura). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ a controller such as that taught by Kimura in the apparatus of Ewen.

Regarding claim 18, Ewen teaches the receiver circuit according to claim 17, wherein said amplifier is a transimpedance amplifier (reference numeral 102 in Figure 3A).

Regarding claim 19, Ewen teaches that said amplifier has a feedback impedance (reference numeral 314 in Figure 3B) for influencing said gain of said amplifier.

Regarding claim 20, Ewen teaches that said feedback impedance (reference numeral 314 in Figure 3B) has an impedance value that is set by a signal at said control terminal (reference numeral 202 in Figure 3B).

Regarding claim 21, Ewen teaches that said feedback impedance (reference numeral 314 in Figure 3B) has a resistance value that is set by a signal at said control terminal (reference numeral 202 in Figure 3B).

Regarding claims 22 and 25, Ewen teaches that said feedback impedance is formed by an impedance network with at least one switching device (reference numeral 314 in Figure 3B) that is switched by said signal at said control terminal (reference numeral 202 in Figure 3B) and said switching device (reference numeral 314 in Figure 3B) alters said impedance of said feedback impedance (reference numeral 314 in Figure 3B) when said switching device is switched.

Regarding claim 23 and 26, Ewen teaches that said switching device is formed by a switching transistor (reference numeral 203 in Figure 2B).

Regarding claim 24 and 27, Ewen differs from the claimed invention in that Ewen fails to specifically teach that said switching transistor (reference numeral 203 in Figure 2B) is a MOS-FET transistor or a bipolar transistor. However, Ewen discloses that the use of other types of devices besides the N-type FET shown can be used, thereby suggesting either MOS-FET transistor or a bipolar transistor. Furthermore, both MOS-FET transistor and a bipolar transistor are very well known in the art and readily available. Moreover, Williams teaches the use of MOSFET transistor in a similar receiver (column 19 lines 65-67). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ either MOS-FET

transistors or bipolar transistors in the device of Ewen without departing from the spirit of the invention.

Regarding claim 28, the combination of Ewen and Williams teaches the receiver circuit of claims 17 and 33, and further teaches that said reception device is a photodiode (reference numeral 101 in Figure 3A of Ewen). The combination of Ewen and Williams differs from the claimed invention in that it fails to specifically teach a duty cycle control that prevents pulse distortions by feeding a current into the amplifier. However, Kimura teaches a duty cycle control that prevents pulse distortions by feeding a current into the amplifier (reference numeral 5 in Figure 1; reference numeral 9 in Figure 4). One skilled in the art would have been motivated to include a duty cycle control in the device of the combination of references in order to reduce pulse width distortion and widen dynamic range (column 7 lines 1-7 of Kimura). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include a duty cycle control that prevents pulse distortions by feeding a current into the amplifier.

Regarding claim 34, Ewen teaches that the at least two gain values are selected to be individually adapted to transmission rates selected from the group of 1 Gbps, 2 Gbps, and 4 Gbps (column 3 lines 31-39).

Regarding claim 35, the combination of Ewen and Williams teaches that the sensitivity is optical sensitivity (inherent in both Ewen and Williams).

Regarding claim 40, Ewen differs from the claimed invention in that it fails to specifically teach a duty cycle control that prevents pulse distortions by feeding a current into the amplifier. However, Kimura teaches a duty cycle control that prevents pulse distortions by

feeding a current into the amplifier (reference numeral 5 in Figure 1; reference numeral 9 in Figure 4). One skilled in the art would have been motivated to include a duty cycle control in the device of the combination of references in order to reduce pulse width distortion and widen dynamic range (column 7 lines 1- 7 of Kimura). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include a duty cycle control that prevents pulse distortions by feeding a current into the amplifier.

Regarding claim 41, the combination of references and Kimura in particular teaches at least one differential amplifier (reference numeral 17 in Figure 3) having a first terminal (reference numeral 16 in Figure 3) coupled to an output terminal of the amplifier and at least a second terminal (reference numeral 3 in Figure 3) coupled to the second terminal of the control circuit.

3. Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ewen in view of Williams and Kimura as applied to claim 17, and further in view of Lewis (U.S. Patent No. 7,002,131).

Regarding claims 29 and 30, the combination of Ewen, Williams, and Kimura differs from the claimed invention in that Ewen fails to specifically teach a package for packaging said optical reception device and said amplifier; said package being a T0-46 package, a TSSOPIO package, or a VQFN20 package, wherein the package has a terminal pin forming the control terminal. However, Lewis teaches that incorporating a receiver like that of the combination of Ewen, Williams, and Kimura into a TO-46 package that includes a terminal pin is well known in the art (column 3 lines 57-63). One skilled in the art would have been motivated to use a TO-46 package due to its thin outline. Furthermore, Ewen discloses that the invention can be

implemented in any physical package (column 3 lines 4-10). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to surround the receiving circuit in package, said package being one of the well known and readily available T0-46 package, a TSSOPIO package, or a VQFN20 package, and include in the package a terminal pin forming the control terminal.

4. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ewen in view of Gaboury (U.S. Patent No. 5,498,865) and Cordell (Patent No. US 6,307,660 B1).

Regarding claim 31, Ewen teaches prescribing a gain value for an amplifier of the receiver circuit in dependence on a bandwidth prescribed for the receiver circuit; setting the gain value of the amplifier at a control terminal of the amplifier by selecting an impedance of an impedance network, wherein the impedance of the impedance network includes at least one variable impedance such that the impedance can be variably set at least by varying the resistance of a transistor of the impedance network according to a gate voltage applied to the transistor (column 5 lines 21-45), and after setting the gain value of the amplifier, using the amplifier to amplify an output signal of an optical reception device (column 5 line 63 – column 6 line 22). Ewen differs from the claimed invention in two manners.

First, Ewen fails to specifically teach determining the gain value in accordance with an equation: $V = K / B$, K specifying a maximum achievable bandwidth-gain product previously determined for the receiver circuit and B denoting the bandwidth prescribed for the receiver circuit. However, Gaboury teaches that optical receiver circuits such as that claimed by applicant and taught by Ewen are known to be governed by the equation $V = K / B$ (column 1 lines 16-43). That being so, one skilled in the art would have determined the gain value in

accordance with the equation claimed by applicant and shown by Gaboury as being well known in the art. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to determine the gain value in the device of Ewen in accordance with the equation claimed.

Second, Ewen fails to specifically teach that the impedance network comprises a plurality o f switching transistors; a plurality of resistors connected in parallel; a plurality of capacitors connected in parallel with the plurality of resistors; and a transistor that functions as a linearly controllable resistor according to a gate voltage such that the impedance of the impedance network is continuously variable. However, Cordell teaches that such impedance networks are well known in the art (see Figures 2-4). Furthermore, given the widespread use of impedance networks and the ability to design impedance networks from basic building blocks such as resistors and capacitors, it would have been well within the realm of knowledge of one skilled in the art to design an impedance network such as that claimed by applicant and disclosed by Cordell. Moreover, one skilled in the art would have been motivated to design an impedance network such as that claimed by applicant and disclosed by Cordell in order to reduce inter-channel interference and noise (abstract of Cordell). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to design and include an impedance network such as that taught by Cordell in the apparatus of Ewen.

5. Claims 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ewen, Williams, and Kimura as applied to claim 17 above, and further in view of Mohandas (U.S. Patent No. 6,933,786).

Regarding claim 38, the combination of Ewen and Williams differs from the claimed invention in that it fails to specifically teach a coding device that recodes the control signal such that the impedance network forms the desired impedance. However, Mohandas teaches a coding device (reference numeral 16, 20 in Figure 1) that recodes the control signal such that the impedance network forms the desired impedance. One skilled in the art would have been motivated to include a coding device that recodes the control signal such that the impedance network forms the desired impedance in order to adjust the input impedance of the circuit (abstract of Mohandas). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include a coding device that recodes the control signal such that the impedance network forms the desired impedance in the device of the combination of references.

Allowable Subject Matter

6. Claim 33 is allowed.

Response to Arguments

7. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (571) 272-3026. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571)272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Agustin Bello/

Primary Examiner, Art Unit 2613